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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,326	02/07/2006	Shoji Sekino	NEC NE70217	6649
27667 7590 06/09/2011 HAYES SOLOWAY P.C. 3450 E. SUNRISE DRIVE, SUITE 140 TUCSON, AZ 85718				
EXAMINER				
ENIN-OKUT, EDUE				
ART UNIT		PAPER NUMBER		
1727				
NOTIFICATION DATE		DELIVERY MODE		
06/09/2011		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/567,326

Applicant(s)

SEKINO ET AL.

Examiner

Edu E. Enin-Okut

Art Unit

1727

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,6-9 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6-9 and 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-942)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

FUEL SUPPLY UNIT FOR FUEL CELL AND FUEL CELL USING SAME

Detailed Action

1. The amendments filed on April 21, 2011 were received. Applicants have amended claims 1, 3, 6, and 9; and, cancelled claims 10 and 12. Claims 1, 3, 4, 6-9 and 11 are pending.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. The rejection of claims 1, 3, 4, and 6-12 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, is withdrawn because claim 1 was amended.
4. The rejection of claims 1, 3, 4, and 6-12 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, is withdrawn because claim 1 was amended.

Claim Rejections - 35 USC § 103

5. Claims 1, 3, 4, 6-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmerman (US 2004/0058222) in view of Hirsch et al. (US 2004/0209133).

Regarding claim 1, 6 and 8, Zimmerman teaches a liquid feed electrochemical fuel cell system, such as a direct methanol fuel cell (DMFC) system, with fuel delivery subsystem 10 ("liquid fuel supply system" with "fuel supplier") (Abstract; para. 26; Fig. 1). The fuel delivery subsystem 10 includes a methanol reservoir 12 ("high concentration fuel vessel") separated from fuel reservoir 14 ("fuel vessel") by membrane 16 ("permeation control film") (para. 26,27).

The methanol reservoir 12 contains substantially pure methanol 22 ("high concentration liquid") while the fuel reservoir 14 contains a fuel mixture 24 (e.g., a dilute mixture of methanol and water) ("liquid fuel") (para. 26,27). The membrane 16 ("permeation control film") allows the passive control of methanol concentration by controlling the flow of methanol from methanol reservoir 12 to fuel reservoir 14 (para. 27,28,29). A fuel cell stack port 18 ("a first fuel passage") connects the fuel reservoir 14 to a fuel cell stack ("plurality of unit structures") (para. 27). A fuel exhaust port 20 ("second fuel passage") connects the fuel exhaust of the fuel cell stack with the fuel reservoir (para. 27).

Zimmerman does not expressly teach a shutter member.

Hirsch teaches a fuel cell system 100 that includes a fuel delivery regulation assembly disposed between a fuel tank 110 and a passive mass transport barrier element 112 (i.e., methanol delivery film, MDF), or between the MDF 212 and a vapor chamber 216 holding fuel fed to the anode (para. 49,51,52; Figs. 1,2). The regulation assembly 120 can be used to limit or control the amount of fuel that travels from the tank 110 to the MDF 112, or the fuel delivery directly to the anode aspect (para. 51,52). An embodiment of the regulation assembly includes a slidable shutter assembly 400 with the size of its apertures controlled by the placement of first and second components 402a,402b (para. 53-59; Figs. 3A-4B). The shutter assembly is actuated by a control system 408 which may include mechanical means, such as servos and/or a motor with a gear and lever assembly (para. 58,59; Figs. 4A,4B). The control means may response to feedback from the fuel cell system, such as that generated based on the concentration of fuel that is being delivered to the anode aspect of the MEA (para. 66). Another aspect of the fuel delivery regulation assembly includes a fuel flow control element 1205 that is an expandable material actuated by a variety of mechanisms, such as methanol concentration, in order to regulate the flow of fuel to the MEA (para. 78,79; Figs. 12A,12B).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a shutter member in the fuel supplier of the fuel cell of Zimmerman because Hirsch teaches that a shutter assembly is an additional means with which to limit or control the flow of fuel that operates using fuel characteristics such as its concentration. Further, since all the claimed elements were known in the prior art, one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination yields nothing more than predictable results to one of ordinary skill in the art. *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395 (2007); *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atlantic & P. Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950).

As to the functional limitations recited in these claims, these limitation has been considered, and construed as the manner of operating an apparatus that adds no additional structure to the fuel supplier as claimed. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP 2114. However, because the fuel supplier used in the fuel cell system of Zimmerman, as modified by Hirsch, is structurally similar to that instantly claimed, it appears capable of being operated as claimed with similar if not identical characteristics.

Regarding claims 3, 4 and 9, it has been held that a recitation with respect to the manner in which a claimed apparatus is to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

However, Zimmerman does teach that the membrane 16 ("permeation control film") swells upon contact with methanol 22 in methanol reservoir 12 (para. 27,28). Contact between the swollen membrane 16 and the fuel cell mixture 24 in fuel reservoir 14 causes methanol to migrate from the membrane 16 to the reservoir 14 to establish an equilibrium concentration of methanol in water in the fuel reservoir 14 (para. 28). The fuel delivery system 10, via the membrane 16, equilibrates to provide concentration of methanol in fuel reservoir 14 suitable for use with the fuel cell stack (para. 29).

Regarding claim 7, Hirsch also teaches a fuel flow control assembly may include a series of expandable components 1121a-c, which expand upon actuation (in response to methanol concentration changes, for example), and a series of second components 1215a-d (para. 79; Fig. 12B). When expandable components 1121a-c are not actuated, the second components 1215a-d are fully open and permit the flow of fuel through it (para. 80). When the expandable components are actuated, they expand which causes the second components to deform and thus restrict the fuel flow (para. 79). The entire assembly may be used as the fuel control element 1205 shown in Fig. 12A (para. 79).

It would have been obvious to one of ordinary skill in the art at the time of the invention to form deformable, second components described by Hirsch above as holes, or cut portions, as part of the permeation control film of the fuel supplier used in the fuel cell system of Zimmerman, as modified by Hirsch, because Hirsch teaches that these holes can serve a fuel flow control function as discussed above.

Regarding claim 11, as discussed above, Zimmerman teaches that the fuel delivery subsystem 10 is useful in a liquid feed electrochemical fuel cell system, such as a direct methanol fuel cell (DMFC) system (para. 26). The reference also teaches that a direct liquid feed fuel cell is a type of solid polymer fuel cell (i.e., a solid polymer electrolyte or ion-exchange

membrane disposed between an anode and a cathode) that operates using at least one liquid reactant stream, like methanol as fuel used by the anode in a DMFC (para. 3-5).

Response to Arguments

6. Applicant's arguments filed on April 21, 2011 have been considered, but applicant has amended the claims such that new grounds of rejection were necessitated.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Edu E. Enin-Okut** whose telephone number is **(571) 270-3075**. The examiner can normally be reached on Monday to Thursday, 7 a.m. - 3 p.m. (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara L. Gilliam can be reached on (571) 272-1330. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edu E Enin-Okut/
Examiner, Art Unit 1727

/Barbara L. Gilliam/
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